



# FX2B Design Reference

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## A Wing-Body Fairing Design for the DLR-F6 Model: A DPW-III Case Study

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FX2B Fairing Geometry  
Slide 1 of 10





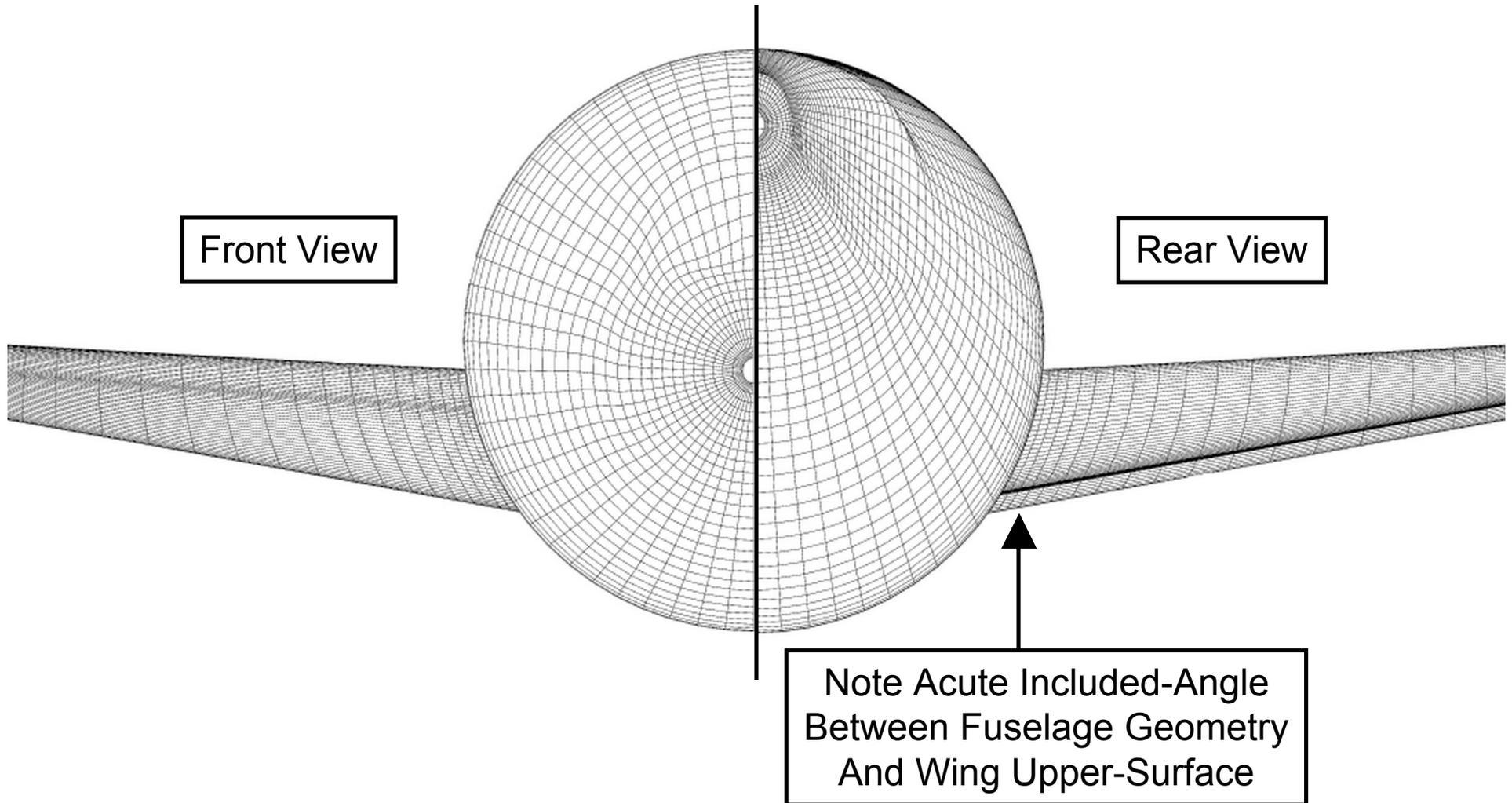
# FX2B Design Objectives

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- Eliminate Flow Separation at SOB
  - Based on OVERFLOW Solutions
    - $M=0.75$  ,  $CL=0.5$  ,  $Rn=3M$
    - Central-Difference & Baldwin-Barth
    - Worst-Case Scenario of Separation
- Retrofit Add-On Part to DLR-F6 Model
- Available to Public Domain
  - Not Based on a Proprietary Process
  - Not Constrained by Real-World Factors
  - Not a Drag Minimization Study

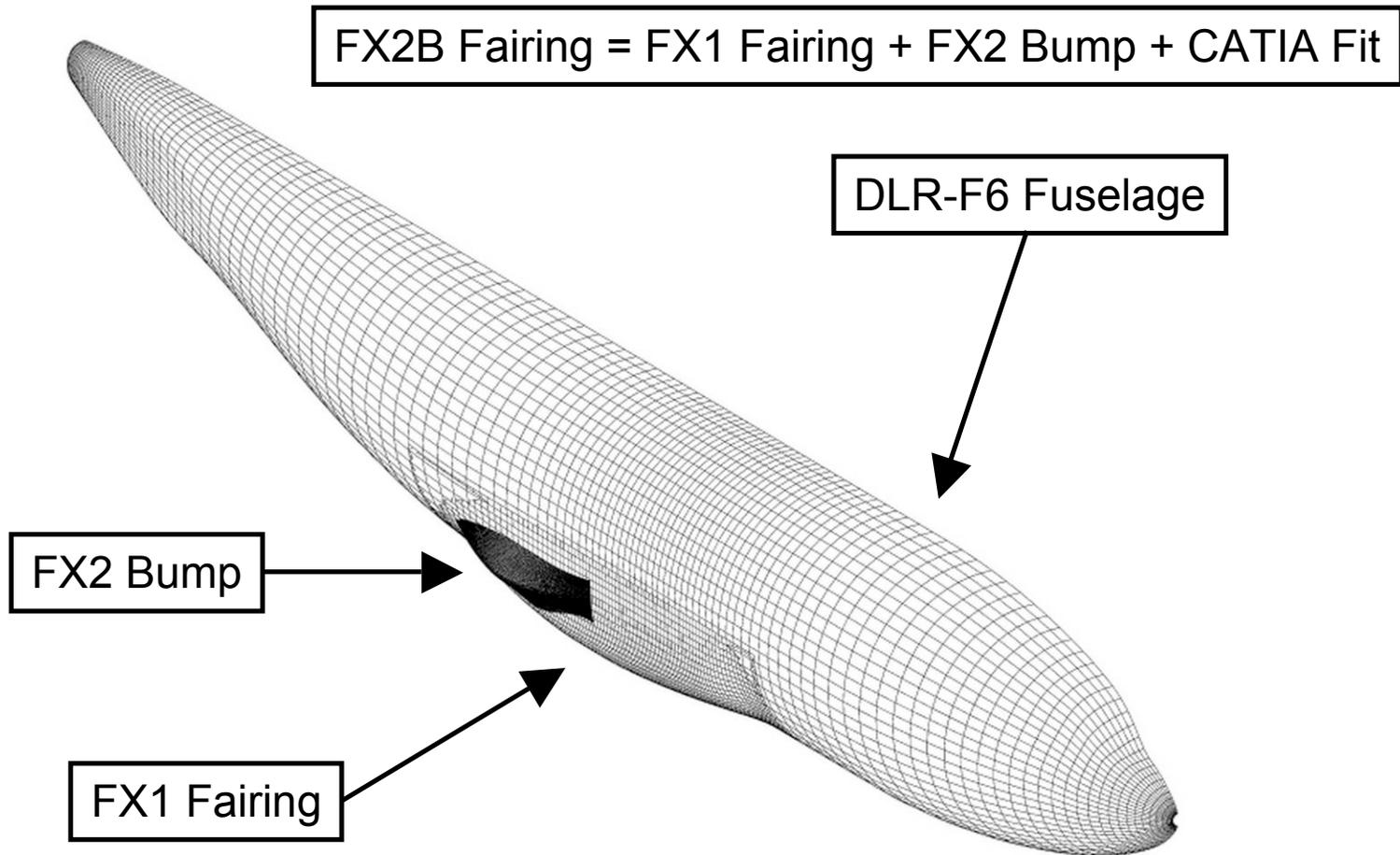


# Baseline DLR-F6 WB





# DLR-F6 Fuselage w/ FX2B





# FX2B Fairing Geometry

FX2B Fairing = FX1 Fairing + FX2 Bump + CATIA Fit

Close-Up View

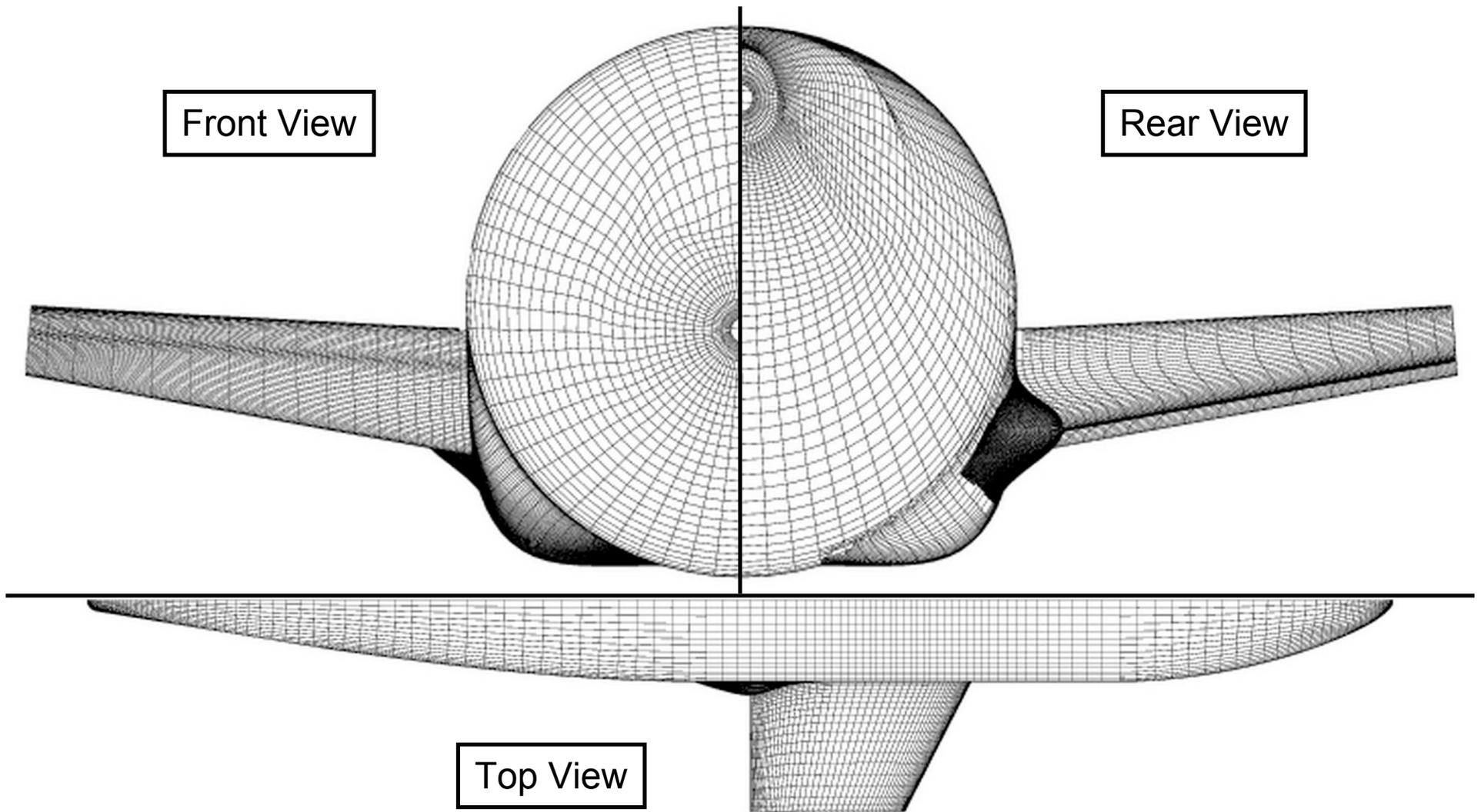
FX2 Bump

FX1 Fairing



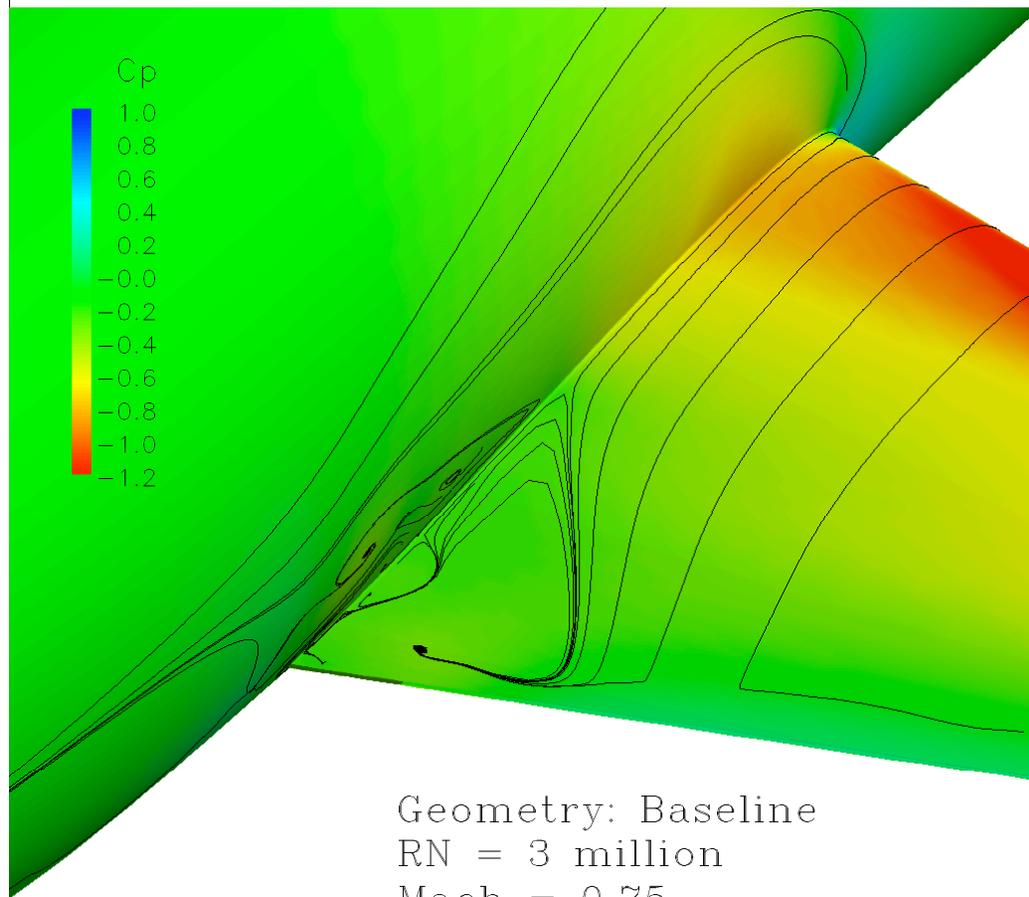


# DLR-F6 WB w/ FX2B





# Baseline F6 w/o Fairing



Note Large SOB Separation

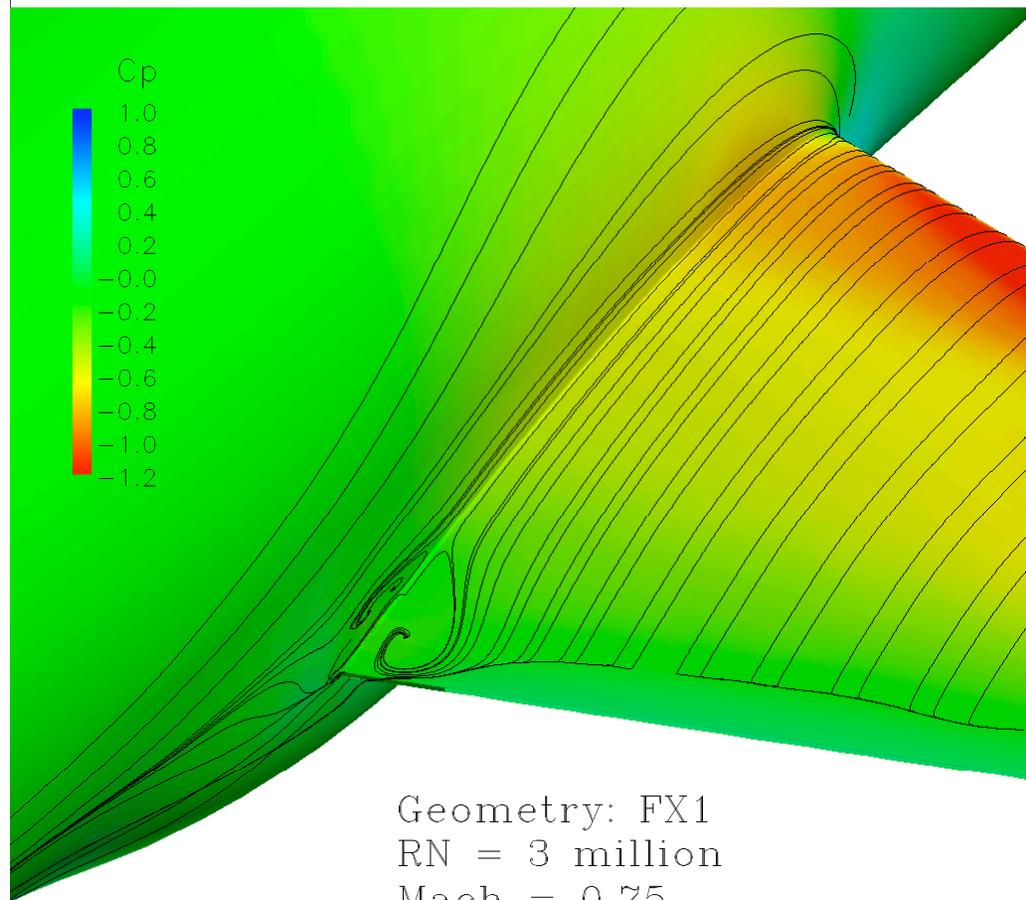
OVERFLOW  
Baldwin-Barth

Geometry: Baseline  
RN = 3 million  
Mach = 0.75  
Alpha = 0.370 deg  
CL = 0.501





# DLR-F6 w/ FX1 Fairing



SOB Separation  
Greatly Reduced

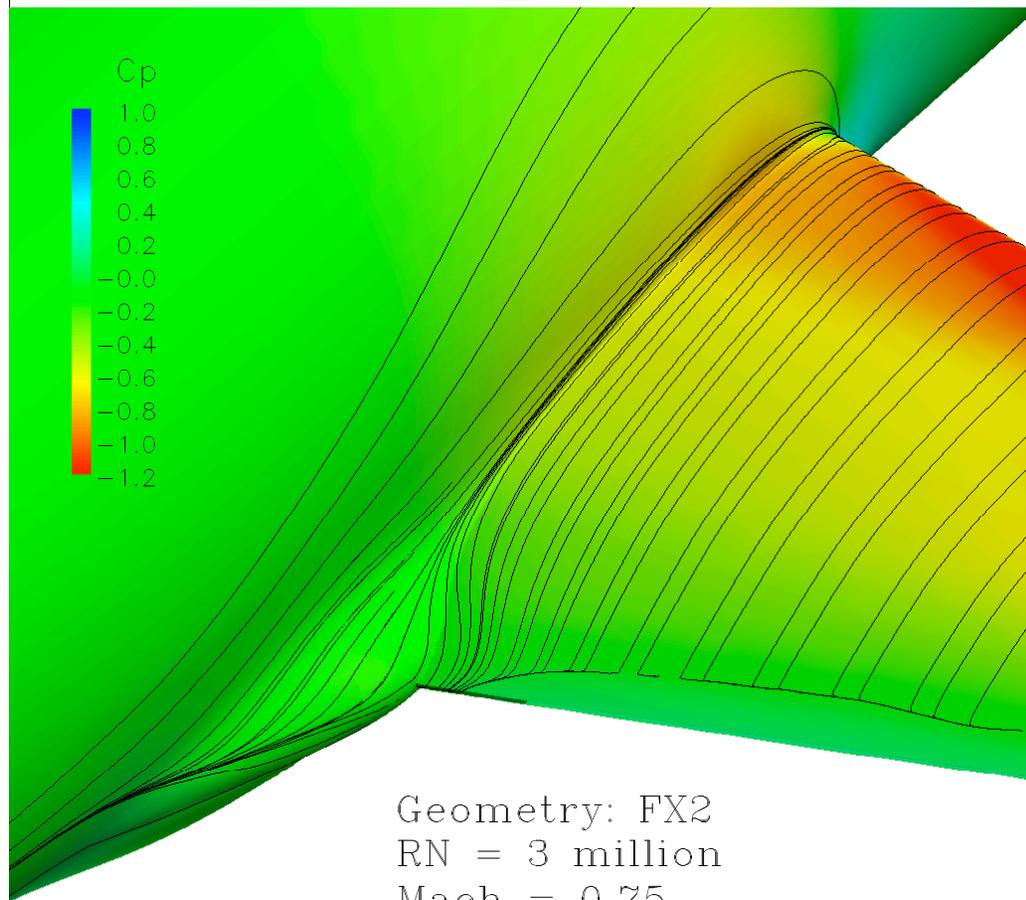
OVERFLOW  
Baldwin-Barth

Geometry: FX1  
RN = 3 million  
Mach = 0.75  
Alpha = 0.118 deg  
CL = 0.501





# DLR-F6 w/ FX2B Fairing



SOB Separation  
Is Removed

OVERFLOW  
Baldwin-Barth

TE Separation  
Persists Away  
From SOB

Geometry: FX2  
RN = 3 million  
Mach = 0.75  
Alpha = 0.117 deg  
CL = 0.50





# DLR-F6 Wing-Body

## Surface Streamlines – Side of Body Flow

Medium Grid, Mach = 0.75,  $C_L = 0.50$ ,  $R_N = 5.0$  million, Fully Turbulent, SA

